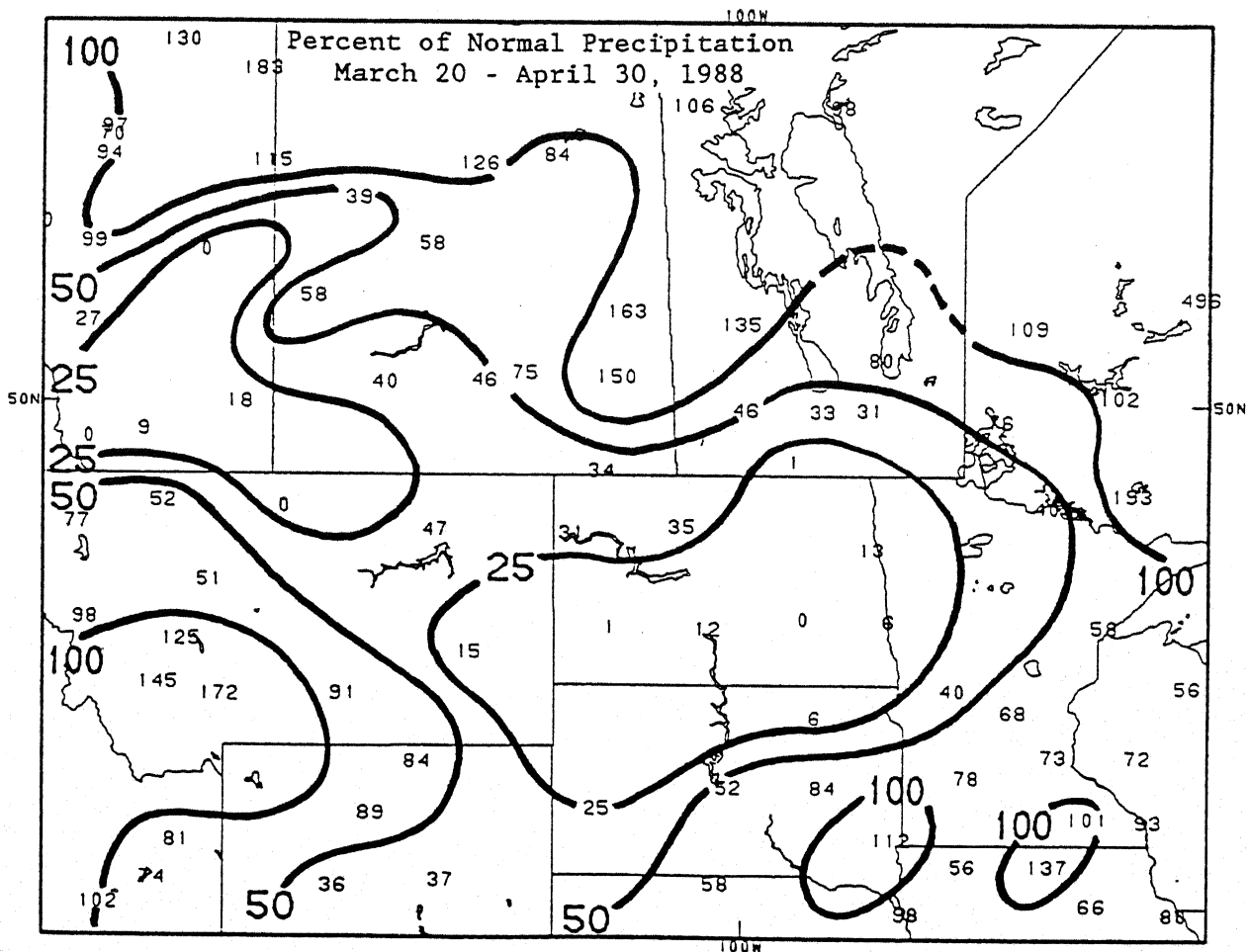


WEEKLY CLIMATE BULLETIN

No. 88/18

Washington, DC

April 30, 1988



PRECIPITATION NORMALLY INCREASES IN THE SPRING AND REACHES A MAXIMUM DURING THE SUMMER MONTHS IN THE NORTHERN GREAT PLAINS, UPPER MIDWEST, AND SOUTHERN CANADA. SO FAR THIS SPRING, HOWEVER, PRECIPITATION HAS BEEN RATHER DEFICIENT THROUGHOUT MOST OF THE AREA AS THE GROWING SEASON GETS UNDERWAY. REFER TO THE SPECIAL CLIMATE SUMMARY FOR FURTHER DETAILS.

NOAA - NATIONAL WEATHER SERVICE - NATIONAL METEOROLOGICAL CENTER

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GLOBAL CLIMATE HIGHLIGHTS

MAJOR CLIMATIC EVENTS AND ANOMALIES AS OF DECEMBER 11, 1993

1. Southwestern Alaska:

WET WEATHER EASES.

Less than 30 mm of precipitation was observed in the region; however, six-week moisture surpluses still ranged from 50 to 140 mm [WET - Ending at 7 weeks].

2. West-Central North America:

ABUNDANT RAINS REPORTED.

Up to 225 mm of precipitation fell on the southern Cascades and northern Sierra Nevadas as Pacific storms tracked through the region, ending their recent dry spell (see page 4) [DRY - Ended at 16 weeks].

3. East-Central South America:

STILL ABNORMALLY WET.

As much as 80 mm of rain fell on northeastern Argentina, northern Uruguay, and extreme southern Brazil, with six-week moisture excesses approaching 330 mm at some locations. Farther south, less than 20 mm was observed in southern Uruguay and adjacent parts of Argentina [WET - 8 weeks].

4. Europe:

TEMPERATURES MODERATE; PRECIPITATION BRINGS RELIEF FROM DRYNESS.

Temperatures averaged as much as 5°C above normal, ending the recent cold spell [COLD - Ended at 5 weeks]. Moderate rains of 20 to 50 mm and wind gusts up to 145 kph lashed Britain, the Benelux Countries, and northern Germany, causing the loss several lives, according to press reports [DRY - Ending at 8 weeks]. Farther south, most of the Mediterranean Basin received less than 20 mm of rain [DRY - 8 weeks].

5. Greece:

DRIER CONDITIONS PREVAIL.

Little or no precipitation fell on Greece during the past week, but moisture surpluses since late October were still 60 to 130 mm [WET - Ending at 7 weeks].

6. Southwestern Asia:

COLD WEATHER PERSISTS.

Temperatures averaged 4°C to 11°C below normal across the region as lows plummeted to -40°C in parts of Kazakhstan [COLD - 8 weeks].

7. Southeastern Africa:

HEAVY RAINS SOAK REGION.

As much as 115 mm of rain drenched parts of Zimbabwe, South Africa, and Mozambique, and six-week moisture excesses of 60 to 260 mm prevailed across the region [WET - 6 weeks].

8. East-Central China and Southern Japan:

WETNESS DIMINISHES IN CHINA, PERSISTS IN JAPAN.

Little or no precipitation fell on China while moderate amounts (20 to 85 mm) soaked Japan. During the past six weeks, Japan has recorded surpluses of up to 190 mm [WET - Ending at 7 weeks].

9. Taiwan:

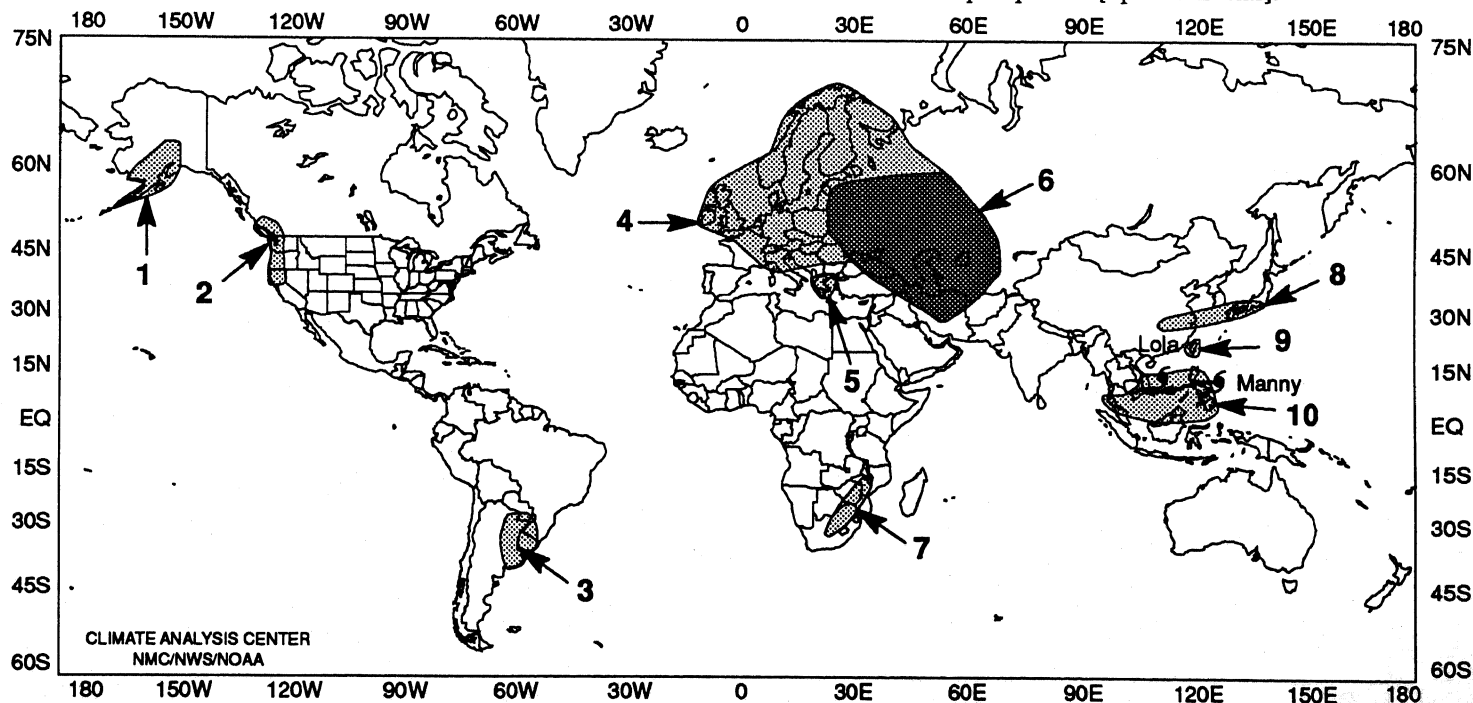
STILL UNUSUALLY DRY.

Little or no rain was recorded at most locations, but isolated showers yielded 10 to 30 mm in northeastern and southwestern portions of the island. Six-week moisture deficits ranged from 60 to 170 mm (see page 2) [DRY - 26 weeks].

10. Southeastern Asia:

TYPHOONS LASH REGION.

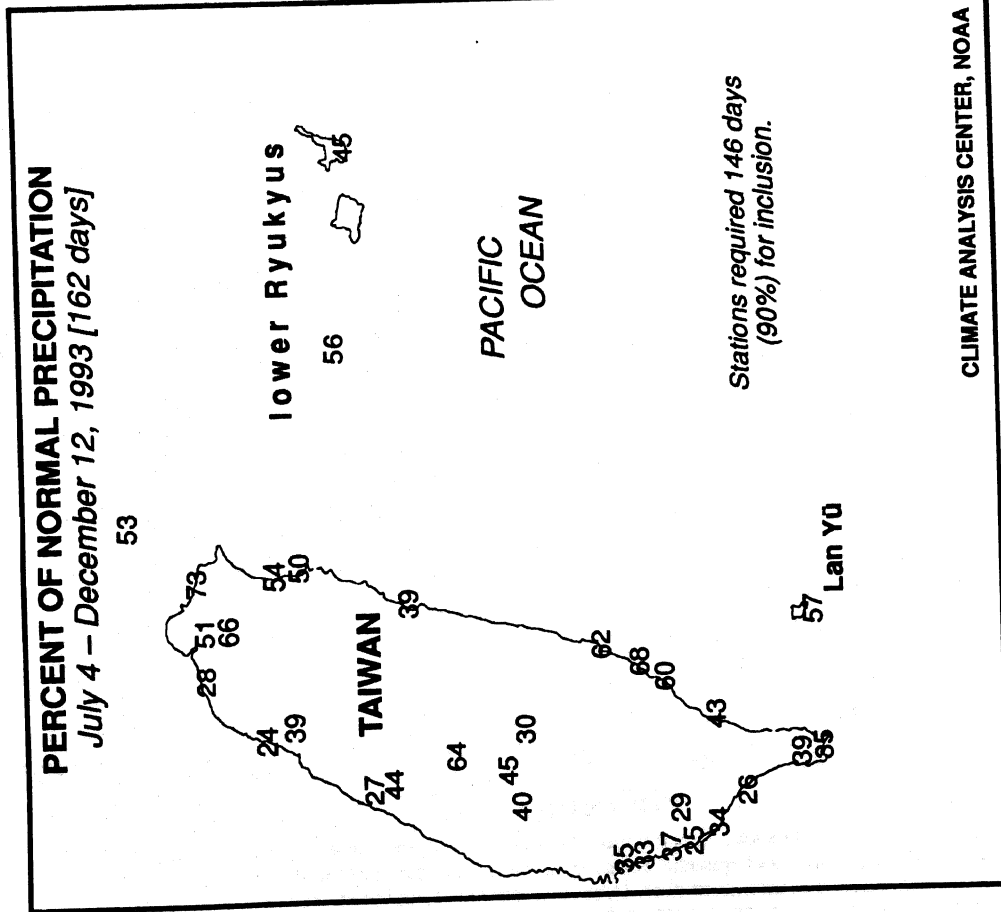
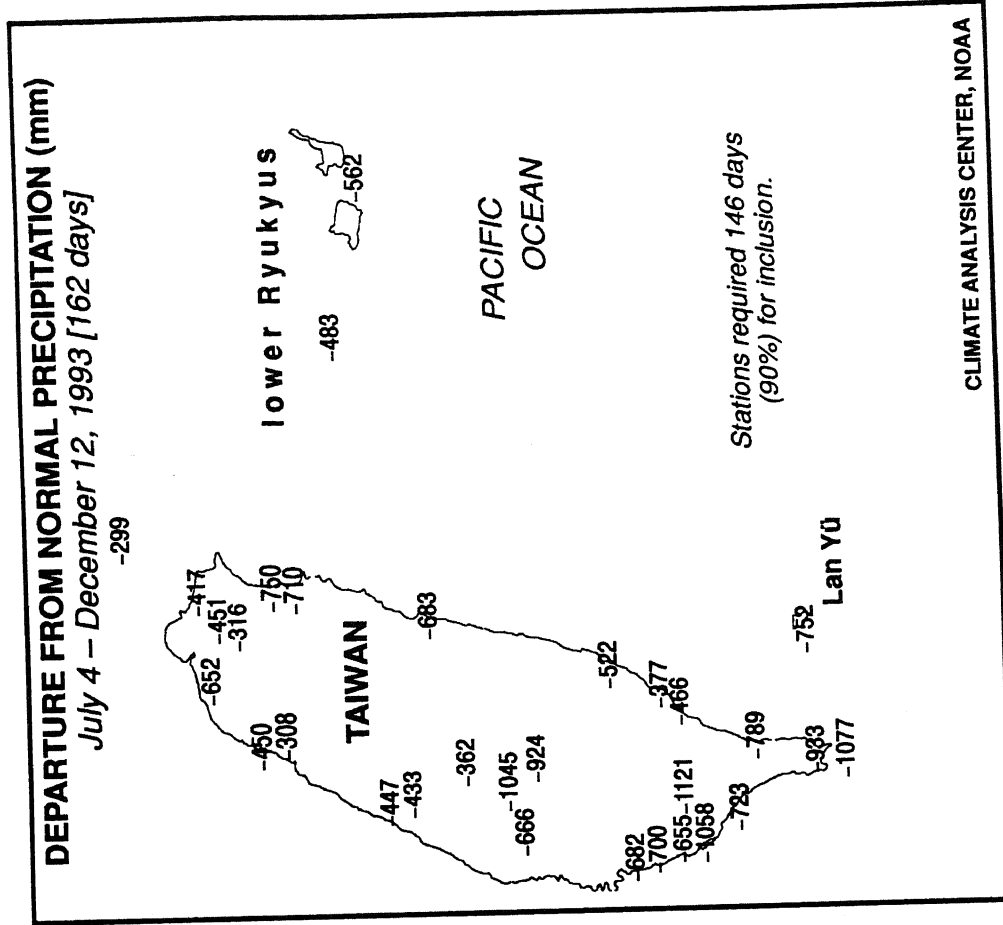
As much as 350 mm of rain fell on eastern Vietnam (primarily from Typhoon Lola) and the Isthmus of Kra while Typhoon Manny delivered up to 570 mm to central and southern Luzon. According to press reports, the two typhoons claimed more than 300 lives, injured 500 individuals, and caused over \$6.5 million (American) in damage as they passed through the Philippines (see front cover). In sharp contrast, northern Luzon received less than 20 mm of precipitation [Episodic Events].



EXPLANATION

TEXT: Approximate duration of anomalies is in brackets. Precipitation amounts and temperature departures are this week's values.

MAP: Approximate locations of major anomalies and episodic events are shown. See other maps in this Bulletin for current two week temperature anomalies, four week precipitation anomalies, long-term anomalies, and other details.



MUCH DRIER THAN NORMAL CONDITIONS CONTINUE TO DOMINATE TAIWAN AND THE LOWER RYUKYU ISLANDS. Little or no rainfall across the region during the last two weeks, aggravating the prolonged dry spell which began affecting Taiwan and the lower Ryukyus in early July. By December 12, 1993, only 90 – 350 mm of rain had fallen on extreme northern and northwestern Taiwan since July 4. Rainfall totals were somewhat larger elsewhere, but normals were also considerably higher, yielding larger moisture deficits. Between 235 and 435 mm was recorded across southwestern Taiwan, 400 – 850 mm fell across the central third of the country, as well as across the lower Ryukyus, and 500 – 1000 mm was measured in the southeastern and extreme southern sections of the nation, including Lan Yü. These totals represent only 25% – 73% of normal amounts for the 162-day period, with most locations receiving under half of typical totals, except across parts of southeastern and northeastern Taiwan, Lan Yü, and the lower Ryukyus. Accumulated deficits range from 300 – 650 mm through the northeastern quarter of Taiwan and the lower Ryukyus to over 1000 mm at typically wetter locations in central and southern Taiwan.

UNITED STATES WEEKLY CLIMATE HIGHLIGHTS

FOR THE WEEK OF DECEMBER 5 – 11, 1993

Pacific storms battered the Far West during the past week with high wind and heavy precipitation (snow in the higher elevations), bringing an abrupt end to what had been a slow start to the 1993–1994 wet season in the Far West. Over nine inches of precipitation drenched portions of the northern California Coast and the southern Cascades while two to eight inches were common across the western thirds of Washington and Oregon, over the northern third of California, and along the central California Coast. *Unofficial* reports indicated that up to 20 inches may have fallen on isolated locations in northwestern California during the last two weeks. The first major storm of the week struck the Northwest, northern California, and western Nevada on Tuesday and Wednesday. Winds reached 90 mph at Stead, NV while steady winds of 75 mph with gusts to 98 mph were recorded along the northern Oregon Coast. Crater Lake, OR, was blanketed with 27 inches of snow, and one to two feet were common in the higher elevations of the Cascades. More than 50,000 utility customers in western Oregon lost electricity on Wednesday as falling trees downed power lines, according to press reports. During the latter part of the week, a second storm brought more heavy precipitation and high wind to most of the Pacific Seaboard. The storm swept through southern California on Saturday, dropping as much as one and a half inches of rain (unofficially) on some fire-scarred areas, causing small mudslides.

At the start of the week, a strong low pressure system pushed northeastward along the middle and northern Atlantic Coast, soaking much of the mid-Atlantic and Northeast with steady rain. Meanwhile, another low pressure system swept through the northern Plains and upper Mississippi Valley, accompanied by snow, freezing rain, and gusty winds. Up to 15 inches of snow on Saturday (December 4) and early Sunday morning buried portions of western South Dakota. On Tuesday, the system moved over the Atlantic Ocean after generating scattered precipitation across the Great Lakes and Northeast. Farther north, storms dumped as much as 18 inches of snow near Valdez, AK on Sunday and brought blizzard conditions with winds gusting to 60 mph to the Seward Peninsula and Kotzebue Sound on Monday. In the Far West, a Pacific Ocean frontal system brought windy and wet weather to the northern Pacific Coast on Monday and the northern Intermountain West on Tuesday. Heavy rain (with snow in the higher elevations) also doused northern California, western Oregon, and western Washington on Tuesday ahead of a second, stronger Pacific Ocean frontal system.

At mid-week, the powerful Pacific storm tracked inland, bringing heavy rain, freezing rain, heavy snow, and/or strong wind to much of Oregon, Washington, northern California, western Nevada, and Idaho. Elsewhere, high pressure and fair weather dominated the remainder of the contiguous United States, although moderate rain fell along the western Gulf Coast and snowshowers lingered over northern New England. During the

latter part of the week, a pair of cold fronts trekked across the eastern half of the nation. In the relatively warm, moist air ahead of the first front, rain reached from eastern Texas to the central Appalachians on Thursday and extended across the upper Great Lakes, central Gulf Coast, and most of the eastern quarter of the nation on Friday. Both fronts then raced into the Atlantic Ocean on Saturday, with cold Canadian air surging into the eastern third of the nation behind the fronts, triggering lake-enhanced snow from the upper Ohio and upper Tennessee Valleys northeastward to the northern Appalachians. In the Far West, yet another powerful Pacific Ocean storm complex moved into the Pacific Coast states, producing more heavy precipitation and gusty winds. Warmer air pushed into much of the nation as Arctic air retreated northward into Canada. Four daily highs were set in the central Rockies and central and southern Plains on Thursday, ten in the Pacific Northwest and along the Gulf Coast on Friday, and seven in the central Rockies on Saturday.

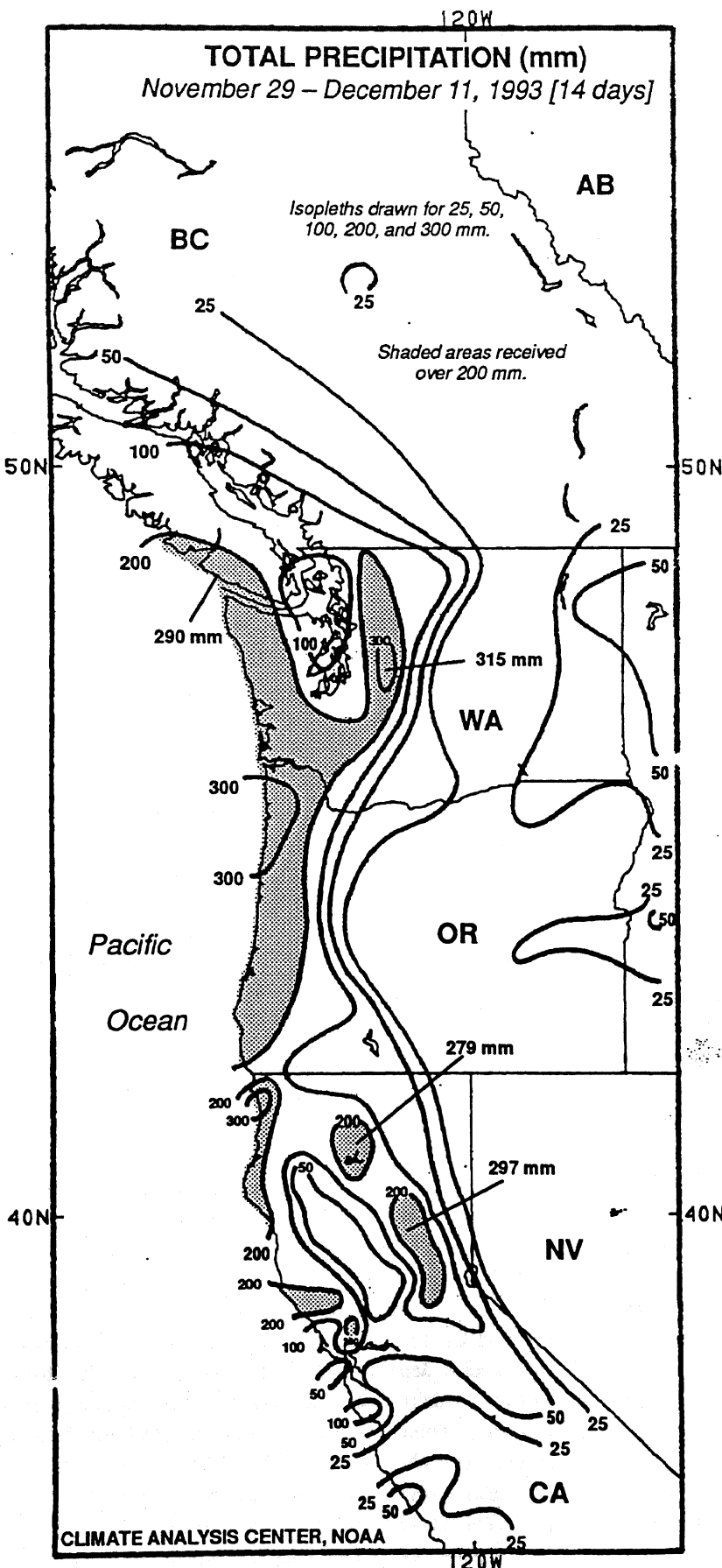
According to the River Forecast Centers, the greatest weekly precipitation totals (between two and ten inches) fell across western Washington, western Oregon, northern California, southern New England, eastern Maine, and northern portions of the middle Atlantic Coast. In addition, totals exceeding two inches were scattered across the central Appalachians, the central Gulf Coast, the Tennessee Valley, the central California Coast, the northern Intermountain West, and southeastern Alaska. Light to moderate amounts were measured in the southeastern and northeastern Plains, much of the Rockies, Hawaii, central and western Alaska, and the remainders of the Far West, the Intermountain West, southern Alaska, and the eastern half of the nation. Little or no precipitation was reported in the southeastern Rockies, northeastern and east-central Alaska, and the remainder of the Great Plains.

Relatively warm
nation. with weekl

Alaska, with weekly departures reaching +13°F at Bettles. Temperatures averaged slightly above normal in western and central Hawaii.

Below normal temperatures were limited to portions of southern California, the central Gulf Coast, and the Southeast, with weekly departures ranging from -3°F to -4°F observed in extreme southern California and northern Florida. Blustery winds, however, combined with a cold surge of Canadian air to produce subzero wind chills across much of the northern half of the nation. In Alaska, below normal temperatures were limited to the western peninsula and Aleutians, with a weekly temperature departure of -5°F reported on St. Paul Island. Temperatures averaged slightly below normal on the Big Island of Hawaii.

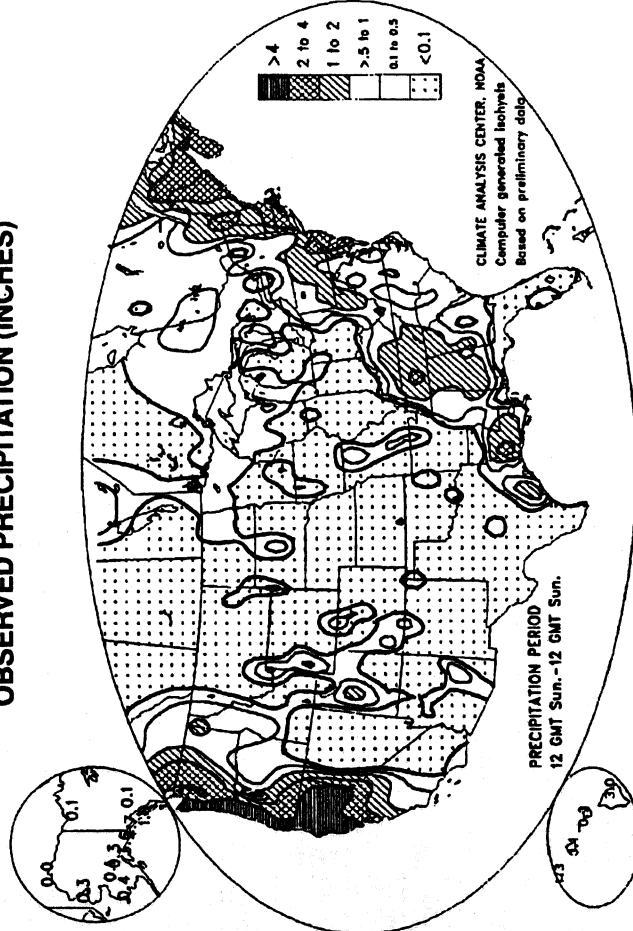
NORTH AMERICAN CLIMATE HIGHLIGHTS FEATURE



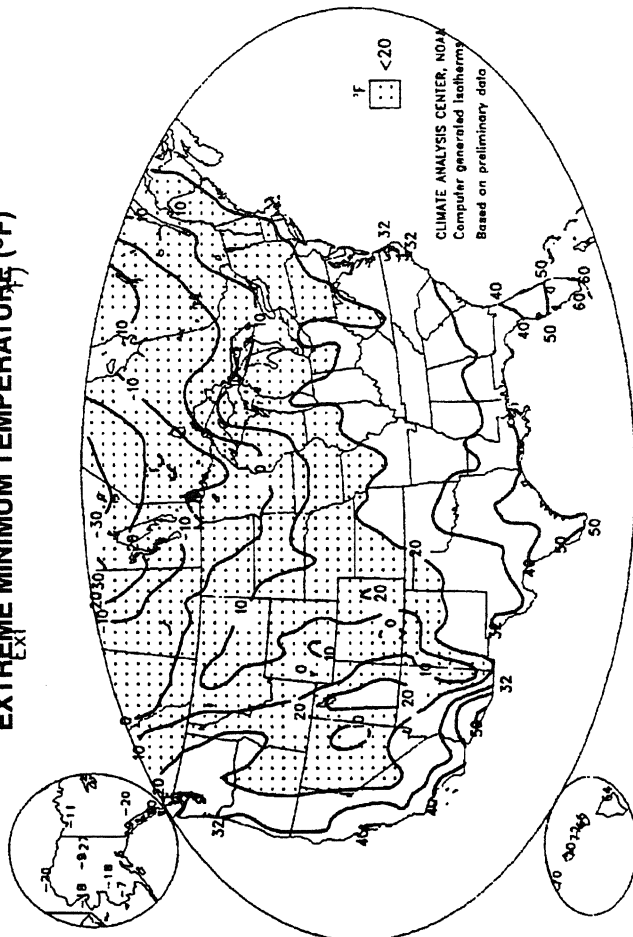
HEAVY PRECIPITATION FALLS ON CENTRAL AND NORTHERN SECTIONS OF THE FAR WEST AND ACROSS SOUTHWESTERN CANADA, ABRUPTLY ENDING THE SLOW START TO THE 1993–1994 WET SEASON. Through most of California, Washington, Oregon, the desert Southwest, and southwestern Canada, precipitation is typically on the increase through meteorological autumn (September – November), at a maximum during winter (December – February), and on the wane in spring (March – May). Autumn 1993, however, brought relatively light precipitation to the region, with large moisture shortages accumulating by late November, particularly in the higher elevations and along the northern Pacific Coast, where normals are higher. The dry spell came to an abrupt end in late November as a series of Pacific Ocean storms moved through the region during November 29 – December 11, 1993. The heaviest precipitation fell on California's higher elevations, on the western thirds of Oregon and Washington, and through the northern Cascades. Up to 315 mm inundated west-central Washington during the 14-day period, and amounts over 200 mm covered southern Vancouver Island, western Washington and Oregon, portions of northwestern and west-central California, and the higher elevations of California's Cascades and Sierra Nevadas. Unofficial reports indicate that over 500 mm may have soaked some locations near Crescent City in northwestern California. Most of the precipitation falling before Dec. 7 provided welcome relief from the recent dry spell, but moisture fell too heavily and too quickly thereafter, especially on Wednesday (Dec. 8) and Friday (Dec. 10). Press reports indicate that heavy precipitation, winds gusting to 140 kph, and at least one tornado afflicted western Oregon on Wednesday, knocking out electrical power for over 50,000 customers. On Friday, heavy rains combined with large quantities of snowmelt runoff (resulting from unseasonably high temperatures, reaching 17°C at Seattle and Olympia, WA) to send the Duckabush River out of its banks in southwestern Washington. On Friday, the combination of heavy precipitation and gusty winds (to 110 kph) combined to cut electrical power for 15,000 customers in southwestern Washington. Rainfall totals were considerably smaller through the southern half of California (only 10–40 mm), but enough moisture fell on hills denuded by autumn's wildfires to generate several small mudslides, particularly near Laguna Beach. Damage, fortunately, was kept to a minimum by recent mudflow-prevention efforts.

UNITED STATES WEEKLY CLIMATE CONDITIONS (December 5 – 11, 1993)

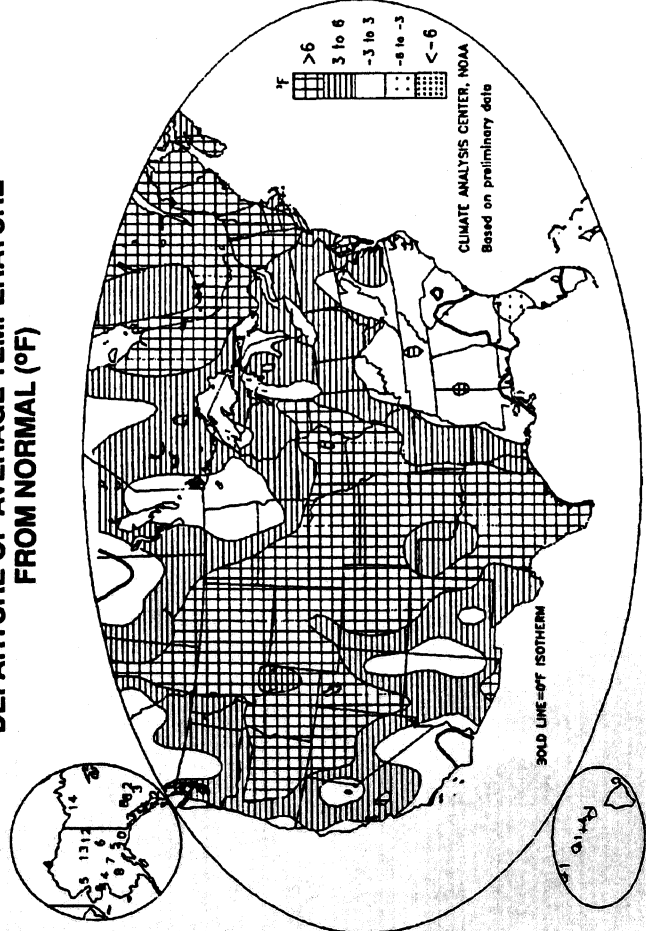
OBSERVED PRECIPITATION (INCHES)



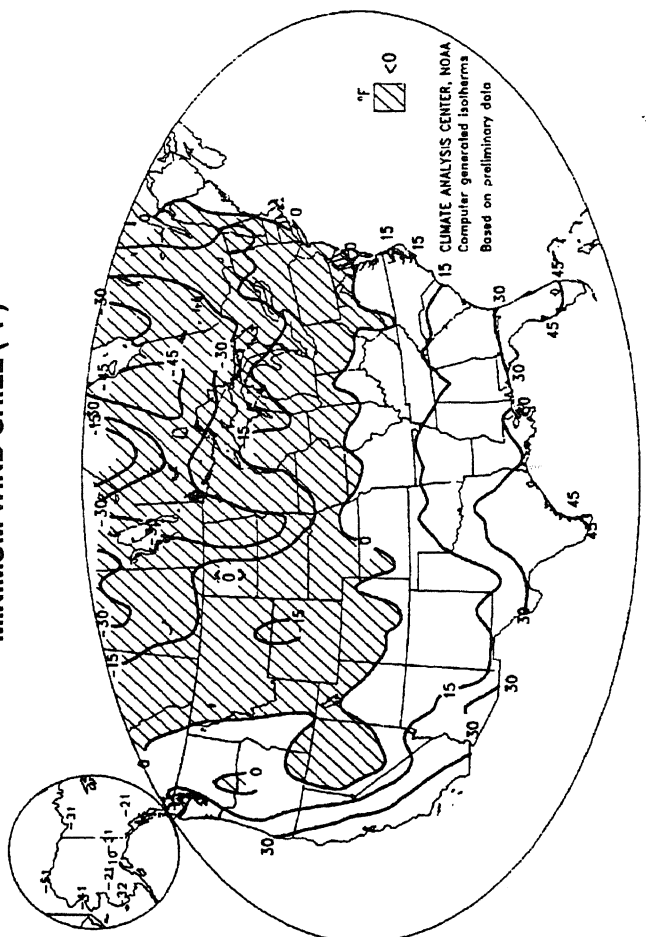
EXTREME MINIMUM TEMPERATURE (°F)



DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F)

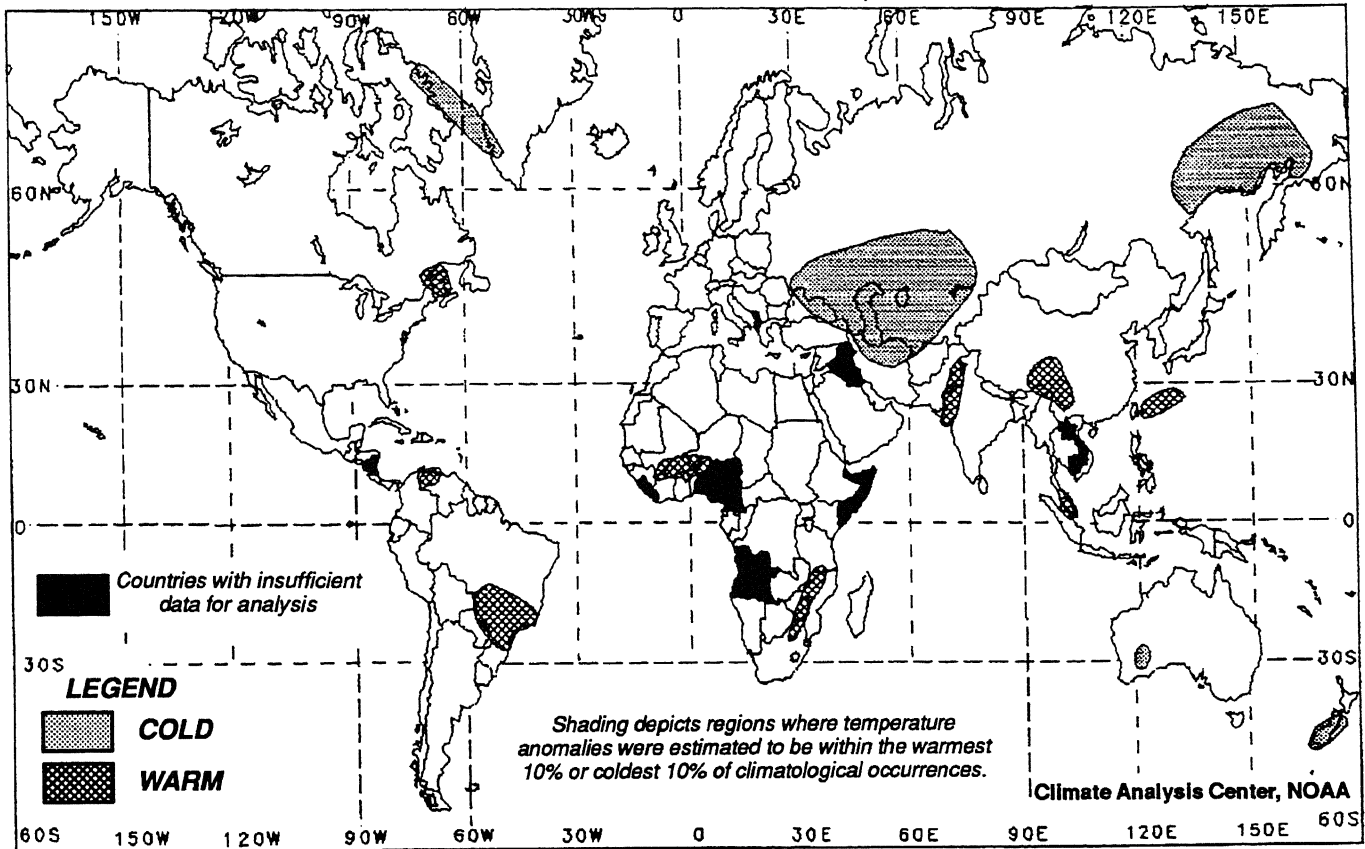


MINIMUM WIND CHILL (°F)



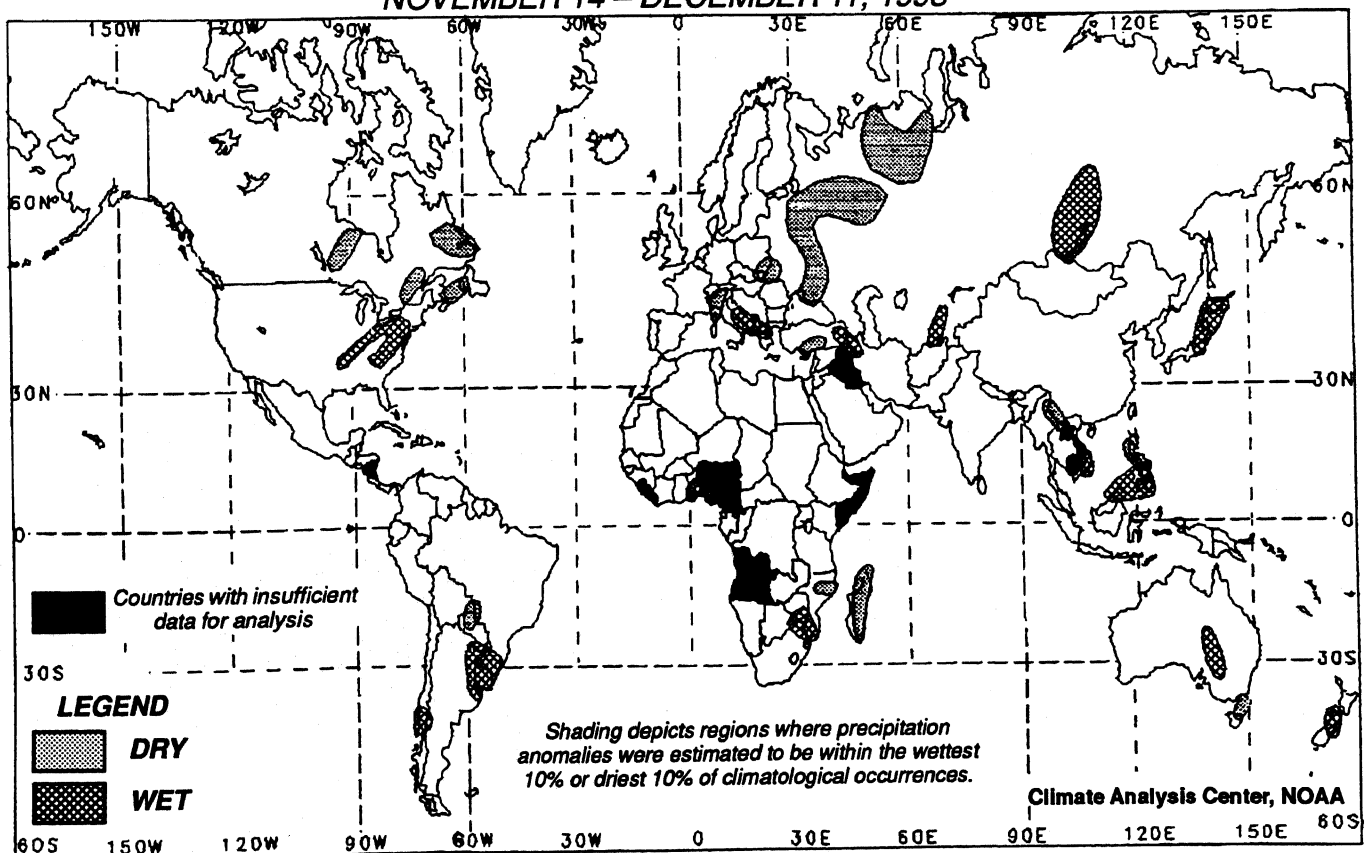
TWO-WEEK GLOBAL TEMPERATURE ANOMALIES

NOVEMBER 28 – DECEMBER 11, 1993



FOUR-WEEK GLOBAL PRECIPITATION ANOMALIES

NOVEMBER 14 – DECEMBER 11, 1993



UNITED STATES MONTHLY CLIMATE SUMMARY

NOVEMBER 1993

During the first full week of November, a second round of fires, fanned by hot and dry Santa Ana winds, afflicted southern California. According to press reports, wildfires incinerated 350 homes, claimed three lives, injured more than 100 people, and scorched 18,000 acres in early November. Since the fires first broke out in late October, nineteen major blazes consumed over 1,100 buildings, claimed three lives, injured about 200 people, scorched more than 200,000 acres, and caused an estimated \$1 billion in damage. Farther east, cold Canadian air plunged southward into the nation from the Intermountain West to the Atlantic Coast, sending temperatures below freezing across the eastern two-thirds of the country, except along portions of the immediate Gulf and Atlantic Coasts. Dozens of daily record lows were set or tied as snow blanketed much of the lower Great Lakes, Ohio Valley, and Appalachians, with up to 19 inches burying parts of north-central Pennsylvania. Elsewhere, a major storm brought strong winds and heavy precipitation to Alaska's Seward Peninsula and lower Kobuk Valley. Farther south, brief but torrential rain (up to one and a half inches in one hour) caused urban and small stream flooding on parts of Oahu, HI.

A tranquil start to the second week of November was characterized by high pressure systems keeping much of the nation dry, but by mid-month, a large storm system formed in the south-central Plains, generating heavy showers and thunderstorms. Up to eight inches of rain inundated portions of southern Missouri and southern Illinois, sending creeks and small rivers out of their banks, claiming several lives, and forcing hundreds of individuals from their homes, according to press reports. Heavy rains also caused flooding in southwestern and central Indiana while a few tornadoes touched down in western and central Arkansas. Farther west, light rains fell on barren hillsides (denuded by the wildfires of previous weeks), causing mudslides in parts of southern California. Scattered rains and gusty winds also affected central and northern California. In addition, record-breaking cold spread across the much of the nation east of the Rockies as temperatures plunged into the teens as far south as northern Arkansas. By mid-November, however, southerly flow brought unseasonably warm weather to the Southeast and the Atlantic Seaboard, with several locations setting new November high temperature records (page 12).

The third week of the month featured more strong storms battering parts of the central and eastern United States. Between four and nine inches of rain soaked portions of the middle Mississippi and Ohio Valleys and central Gulf Coast while severe weather was reported at scattered locations from the southeastern Plains and lower Mississippi Valley eastward to the central Appalachians. Heavy rains sent the White and Wabash Rivers of central and southwestern Indiana out of their banks, forcing about 700 people from their homes. In addition, over 100 people fled from their homes in central Missouri as flooding occurred along the Gasconade and Big Piney Rivers. Small river and stream flooding also plagued Ohio, much of southwestern and south-central Missouri, and southeastern Louisiana. Farther south, this system spawned tornadoes that ripped through Houston, TX and Harrodsburg, KY while straight-line thunderstorm wind gusts caused damage in Brodhead, KY, Huntington, WV, and Ripley, AL. To the northeast, locally heavy lake-effect snows blanketed parts of the lee of the Great Lakes as colder Canadian air was ushered into the East on gusty northerly winds. Dry weather dominated the Far West, and winds gusting above 50 mph fanned a few new wildfires in southern California. Fortunately, all the blazes were quickly extinguished, according to press reports.

A powerful winter storm system moved across the country during the last full week of November. Blizzard conditions prevailed at numerous locations from the Pacific Northwest eastward to the upper Great Lakes and southward to the central High Plains. Up to a foot of snow blanketed the higher elevations of Montana. Meanwhile, slippery roads and near white-out conditions contributed to chain-reaction type motor vehicle accidents on highways in Washington, Utah, and Colorado. The storm disrupted Thanksgiving Eve travel across much of the country as freezing or frozen precipitation spread southward into the central and southern Plains. In addition, record low November temperatures were reported as Arctic air plunged southeastward to the Gulf of Mexico in the storm's wake (page 12). As the system trekked eastward, it tapped tropical moisture and spread torrential rains and gusty winds up the Eastern Seaboard. Streams, creeks, and rivers in

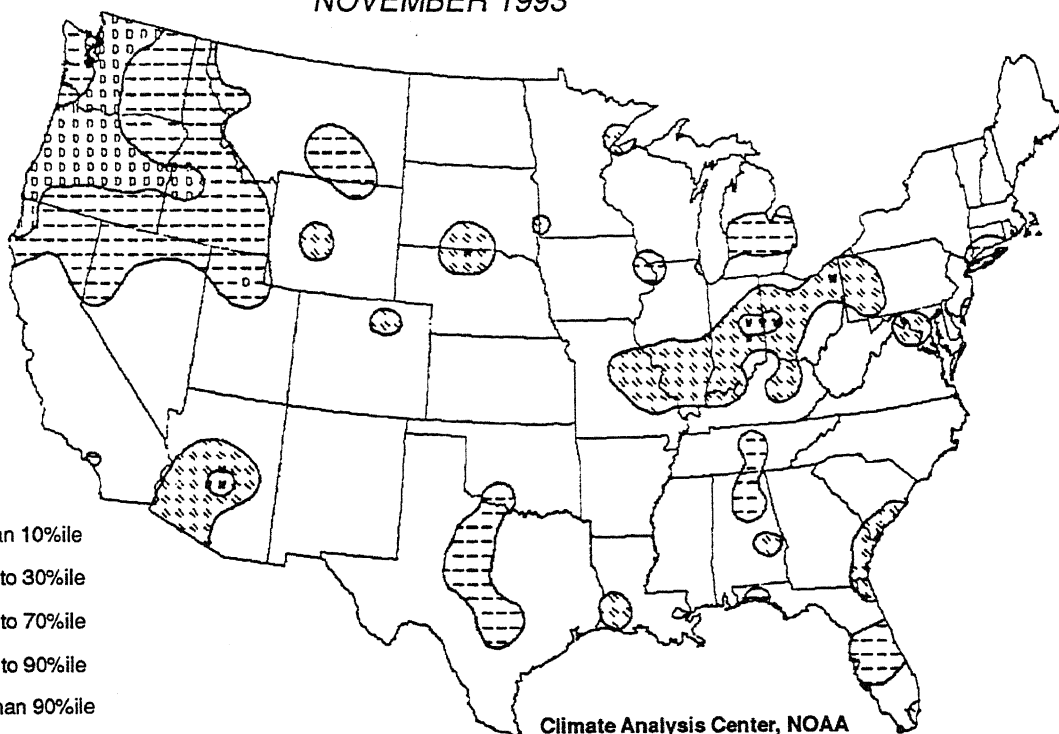
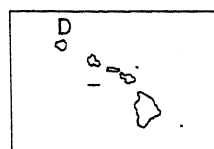
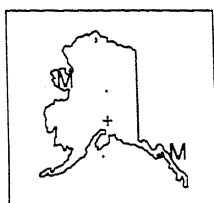
south-central Pennsylvania overflowed their banks, forcing evacuations in communities near Lancaster and York, as daily totals between four and eight inches were common across the mid-Atlantic. Washington, DC received its greatest 24-hour precipitation total in 17 years (4.03 inches), and several major roads were forced to close throughout the region. In New England, wind gusts to 68 mph toppled trees, damaged buildings, and severed power for 26,000 customers. In sharp contrast, more dry weather engendered a 400-acre forest fire near Fort Ross in northern California, and a wildfire in the southern part of the state destroyed condominiums near Anaheim Hills. The end of November featured heavy lake-enhanced snow in the Great Lakes region as the aforementioned storm pulled out to sea. Up to eight inches blanketed parts of eastern Wisconsin, extreme northeastern Illinois, northeastern Ohio, northwestern Pennsylvania, and western New York.

According to the River Forecast Centers, heavy precipitation (over four inches) drenched the South, the Ohio Valley, the Appalachians, the mid-Atlantic, and most of New England, with totals of eight to eleven inches falling on portions of southern Louisiana, southern Mississippi, southeastern Missouri, southern Illinois, eastern Indiana, and central Virginia. In addition, more than four inches of precipitation fell along the Pacific Northwest Coast and across south-central and southeastern Alaska. At least twice the normal totals were observed in the northern Plains, the central High Plains, the desert Southwest, and portions of Indiana and western Ohio (page 8). Above normal precipitation amounts were also recorded in the lower Great Basin, the central Rockies, the north-central states, the Ohio and lower Mississippi Valleys, the Appalachians, and most of Alaska. Based on preliminary calculations from the National Climatic Data Center (NCDC), five of the nine regions reported above median amounts, as did 23 of the 48 contiguous states (page 9). Indiana and Ohio reported the 3rd and 10th wettest such month, respectively, since records began in 1895. Twelve states across the Midwest, the northern Plains, and the Rockies endured one of the ten wettest January – November periods on record, primarily because of excessive rains from April through September. Three states (IA, IL, and MO) reported the wettest such period on record, and six others were among the five wettest January – November periods since 1895 (page 12).

Below normal precipitation prevailed across the Pacific Northwest, the northern Rockies, the southern Plains, parts of the east-central Great Plains and western Corn Belt, and scattered areas across the Southeast (page 8). Subnormal totals were also observed in Hawaii. Four of the nine NCDC regions reported submedian totals, with the Northwest experiencing its 7th driest November on record (page 9). Of the 48 contiguous states, 25 observed submedian amounts, with Washington and Oregon reporting the 5th and 8th driest November, respectively, in the last 99 years (page 9). Despite relatively heavy precipitation in the northern Plains and lower Midwest, the nation as a whole had the 40th driest November on record.

PRECIPITATION PERCENTILES

NOVEMBER 1993

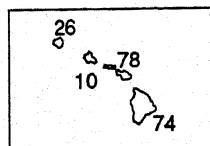
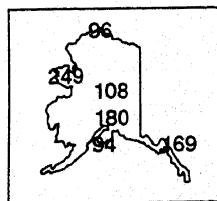
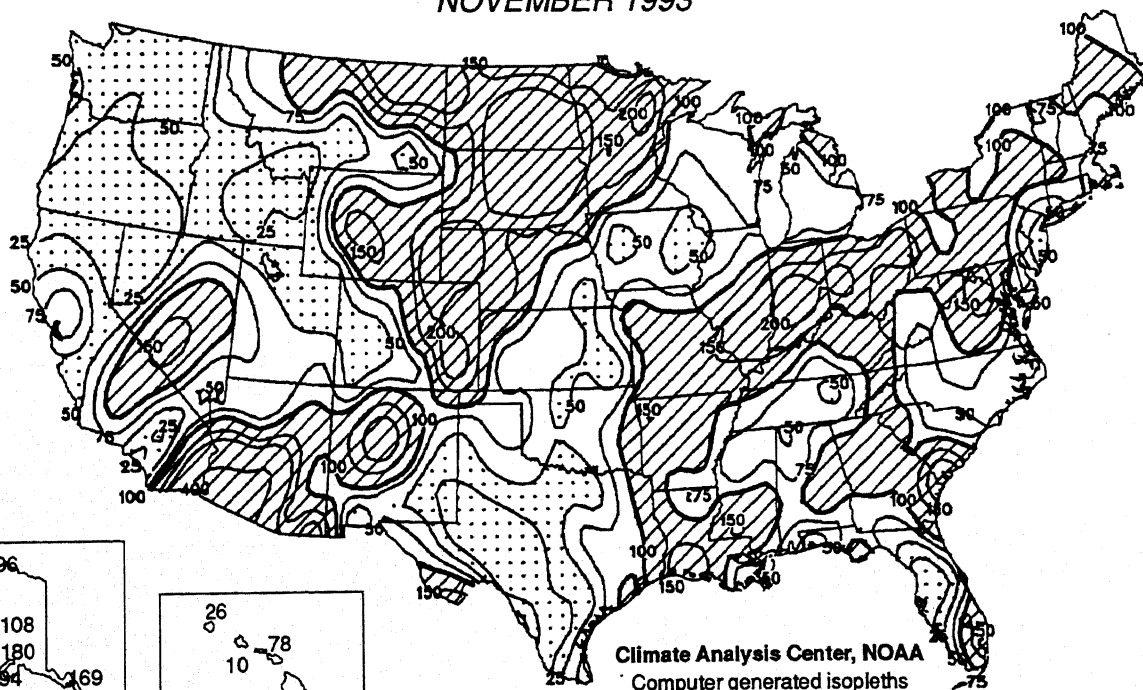


Climate Analysis Center, NOAA

NOVEMBER 1993 PRECIPITATION PERCENTILES, as computed by the Climate Analysis Center. A dry month (<30%ile) was observed across the Northwest and in scattered parts of the High Plains, the southern Great Plains, the Tennessee Valley, central Michigan, and central Florida, with totals among the driest 10% of the historical distribution in parts of Oregon and Washington. Climatologically significant wetness (>70%ile) was limited to parts of the Ohio Valley, the Midwest, and Arizona.

PERCENT OF NORMAL PRECIPITATION

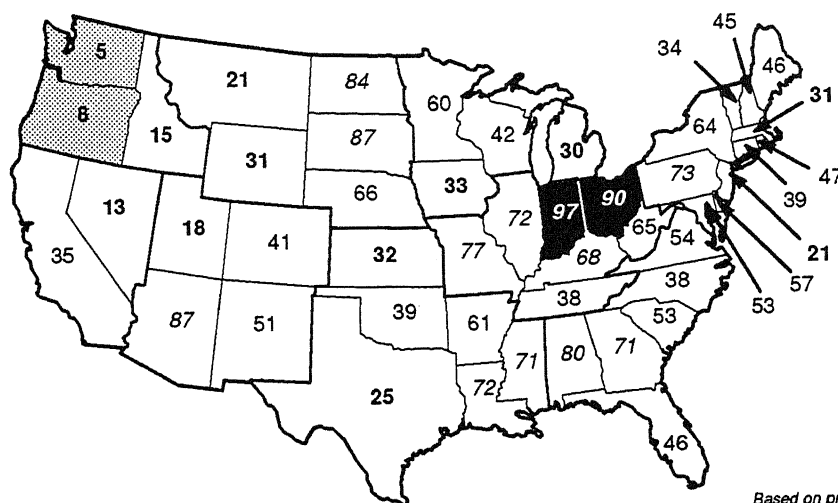
NOVEMBER 1993



Climate Analysis Center, NOAA
Computer generated isopleths
Based on preliminary data

NOVEMBER 1993 PERCENT OF NORMAL PRECIPITATION. Hatched areas received above normal precipitation, and dotted areas reported under half of normal. Above normal precipitation prevailed across the desert Southwest, the southern and central Rockies, the northern Great Plains, the Ozarks, the Midwest, the southern Appalachians, the eastern Great Lakes, and New England during November. In contrast, unusually dry conditions were reported in the Pacific Northwest, the northern Great Basin, the southern Great Plains, and west-central Florida.

HISTORICAL PRECIPITATION RANKINGS BY STATE NOVEMBER 1993



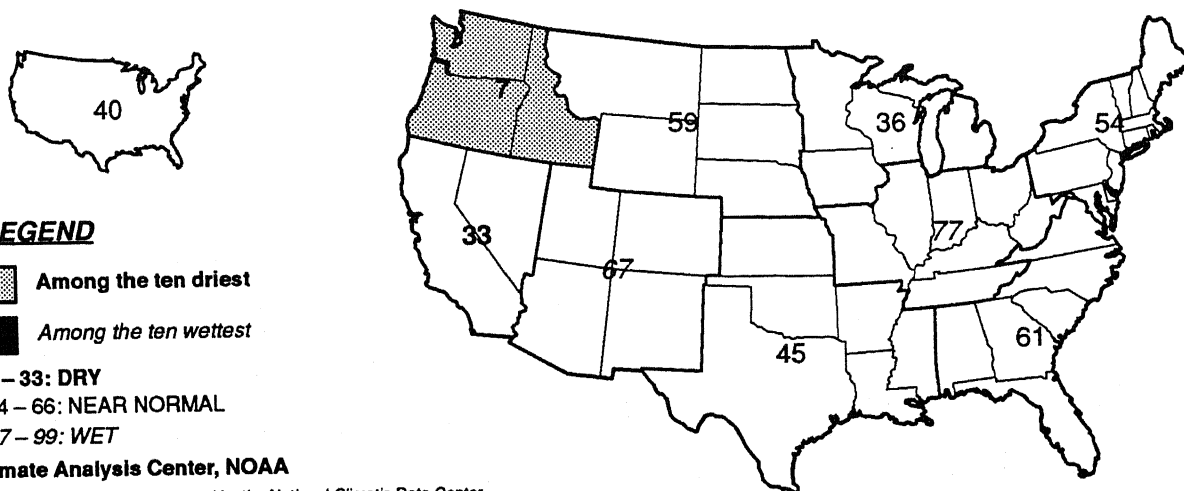
LEGEND

- Among the ten driest
- Among the ten wettest
- 1 – 33: DRY
- 34 – 66: NEAR NORMAL
- 67 – 99: WET

Climate Analysis Center, NOAA

Based on preliminary data generated by the National Climatic Data Center
This chart depicts the ranking of the specific parameter, as measured during the period indicated, with respect to all other such periods on record since 1895.

HISTORICAL PRECIPITATION RANKINGS BY REGION AND NATION NOVEMBER 1993



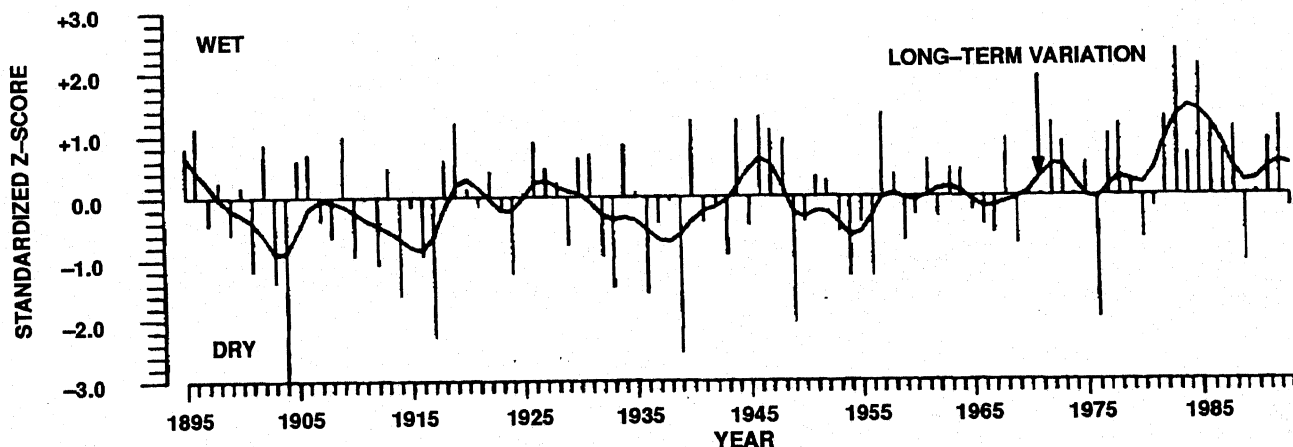
LEGEND

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Climate Analysis Center, NOAA

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This chart depicts the ranking of the specific parameter, as measured during the period indicated, with respect to all other such periods on record since 1895.

U. S. NATIONAL NORMALIZED PRECIPITATION INDEX NOVEMBER 1895 – 1993

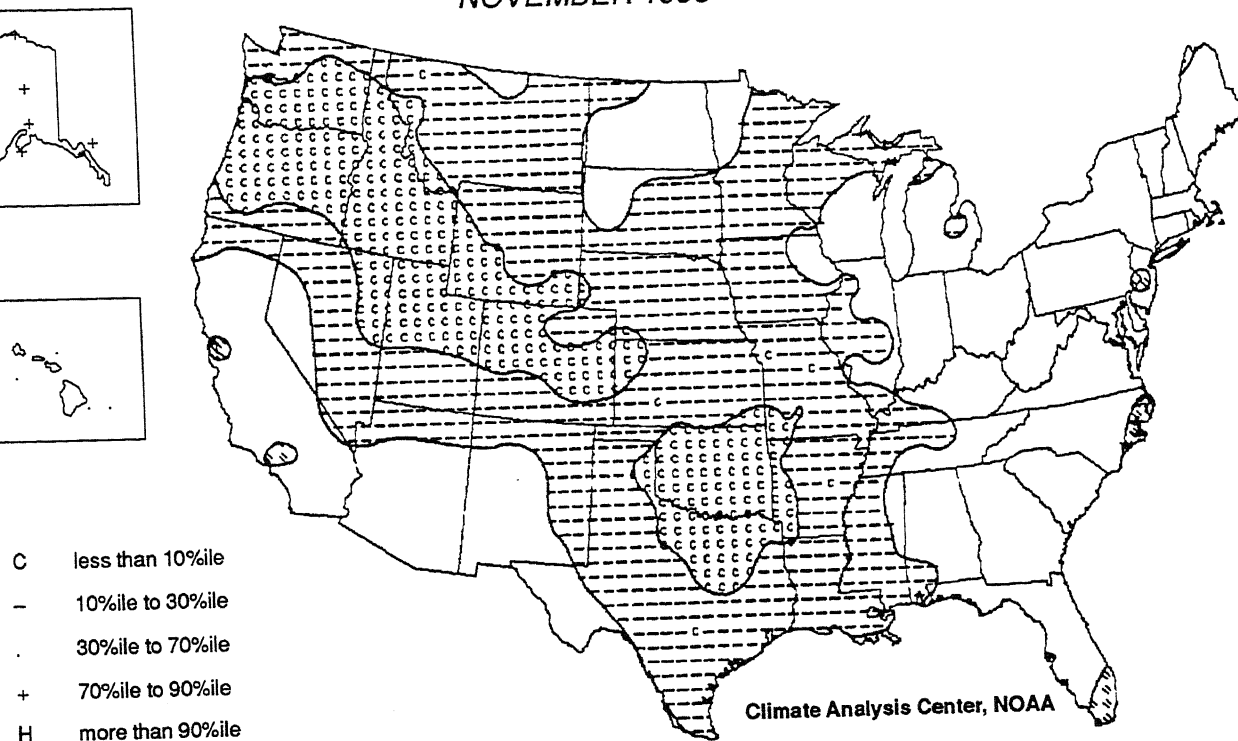


National Climatic Data Center, NOAA

NATIONAL MEAN NOVEMBER 1993 PRECIPITATION INDEX, as computed by the National Climatic Data Center. November 1993 was the 40th driest such month on record. This index takes local normals into account so that regions with large precipitation amounts do not dominate the index value.

TEMPERATURE PERCENTILES

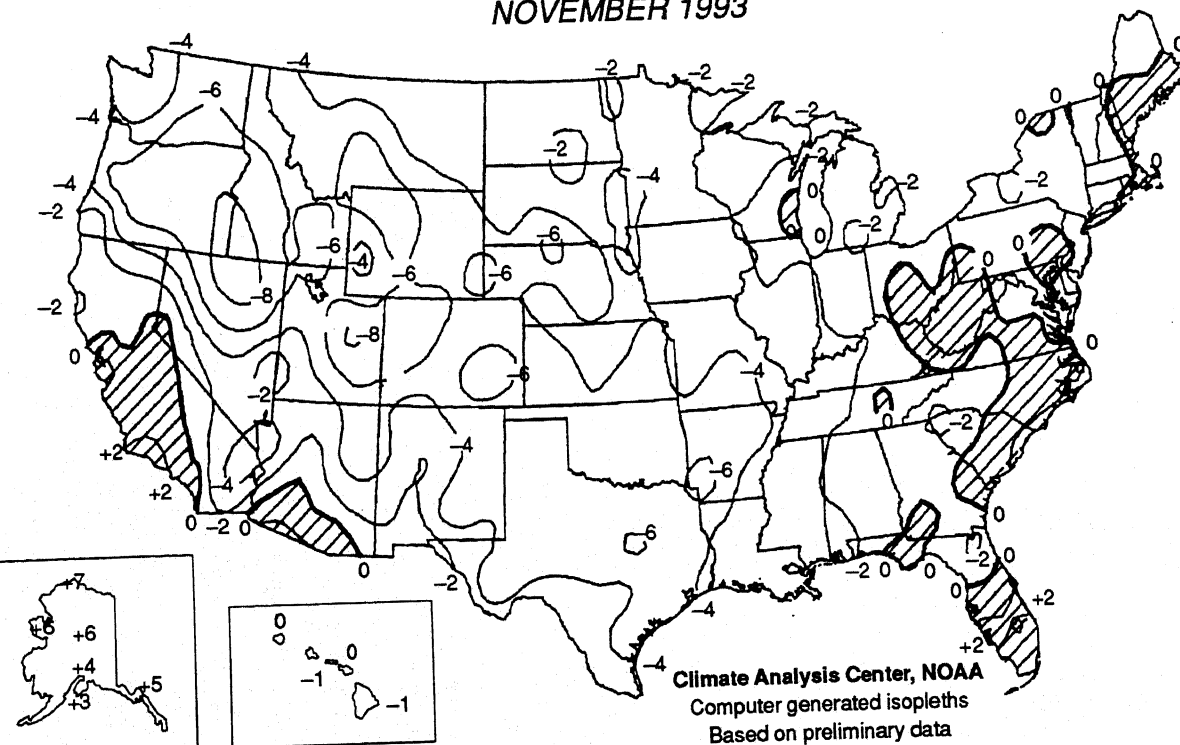
NOVEMBER 1993



NOVEMBER 1993 TEMPERATURE PERCENTILES, as computed by the Climate Analysis Center. Unusually cold weather (<30%ile) dominated much of the western and central United States, with monthly mean temperatures among the coldest 10% of the 1961-1990 historical distribution across much of the Pacific West, central Rockies, and southern Plains. Abnormally warm conditions (>70%ile) were limited to small areas along the central and southern East Coast.

DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F)

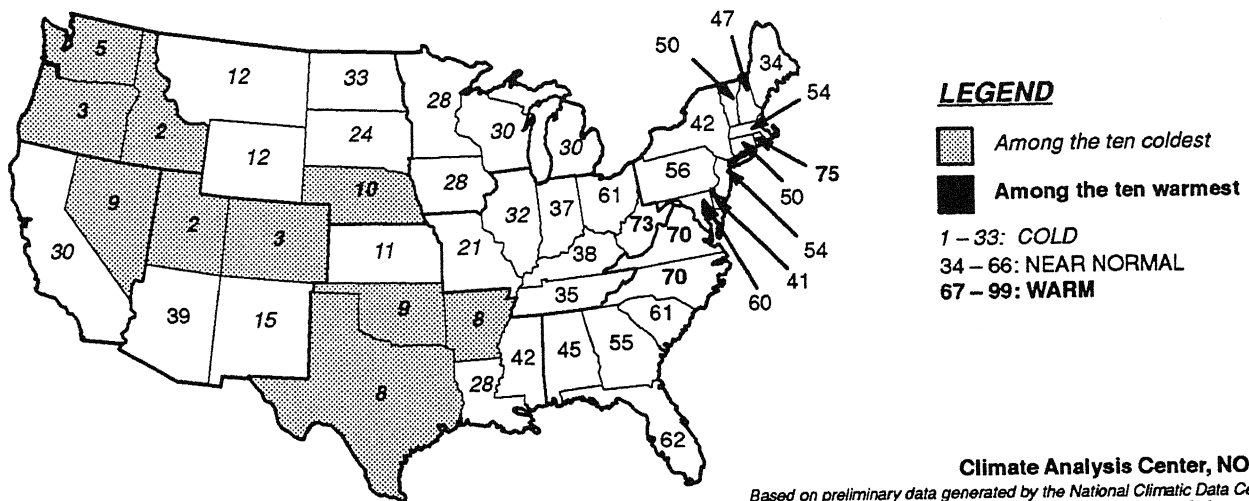
NOVEMBER 1993



NOVEMBER 1993 DEPARTURE OF AVERAGE TEMPERATURE FROM NORMAL (°F). Shaded areas experienced isotherms above normal temperatures. Temperatures below -4°F across most of the West and the southern Plains. In contrast, unusually high temperatures were limited to parts of California and Arizona and portions of the Eastern Seaboard.

HISTORICAL TEMPERATURE RANKINGS BY STATE

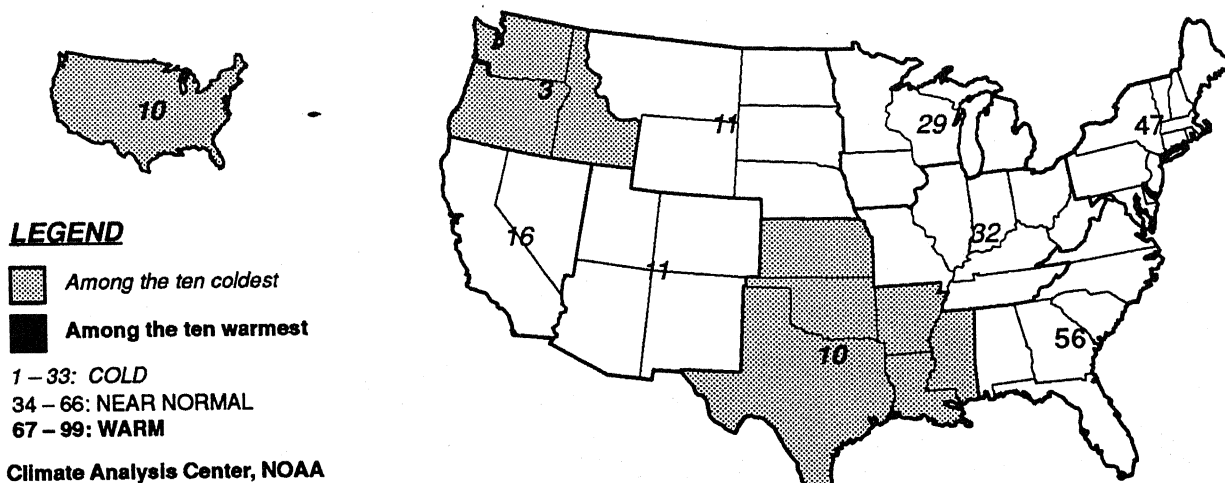
NOVEMBER 1993



This chart depicts the ranking of the specific parameter, as measured during the period indicated, with respect to all other such periods on record since 1895.

HISTORICAL TEMPERATURE RANKINGS BY REGION AND NATION

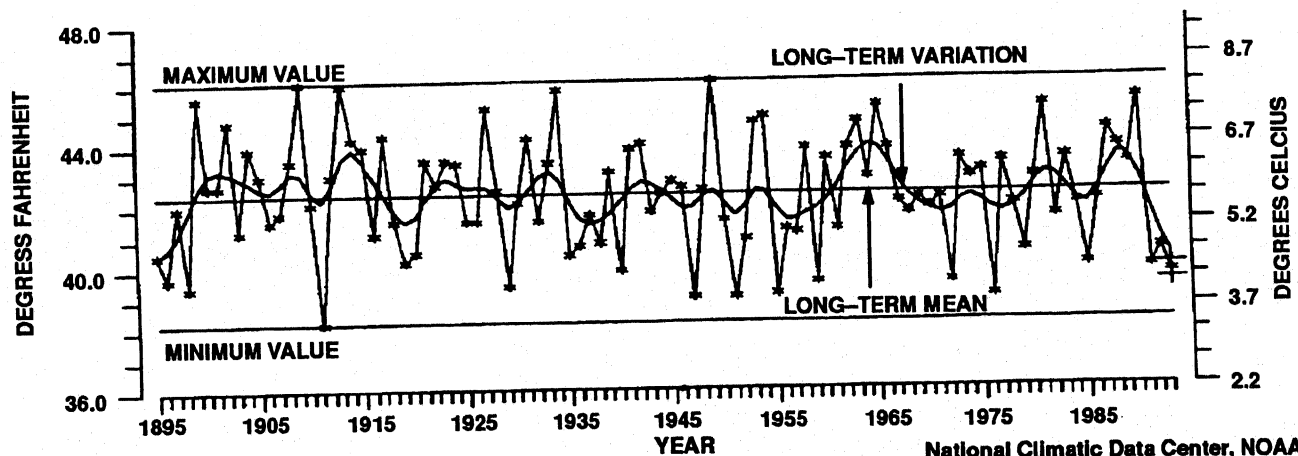
NOVEMBER 1993



This chart depicts the ranking of the specific parameter, as measured during the period indicated, with respect to all other such periods on record since 1895.

U. S. NATIONAL TEMPERATURE

NOVEMBER 1895 - 1993



NATIONALLY AVERAGED NOVEMBER 1895-1993 TEMPERATURES, as computed by the National Climatic Data Center. November 1993 was the 10th coldest such month on record, and the third successive November to average at least 2°F colder than normal nationally. The index was dominated by an extensive area of submedian temperatures across the western and central United States.

TABLE 1. RECORD NOVEMBER PRECIPITATION

STATION	TOTAL (IN)	NORMAL (IN)	PCT. OF NORMAL	RECORD TYPE	RECORDS BEGAN
ATLANTA, GA	5.26	2.19	240.2	HIGHEST	1945

NOTE: Trace precipitation is considered ZERO precipitation. Stations with no precipitation are only included if normal precipitation is 0.25 inches or more.
***** - Percent of normal not calculable.

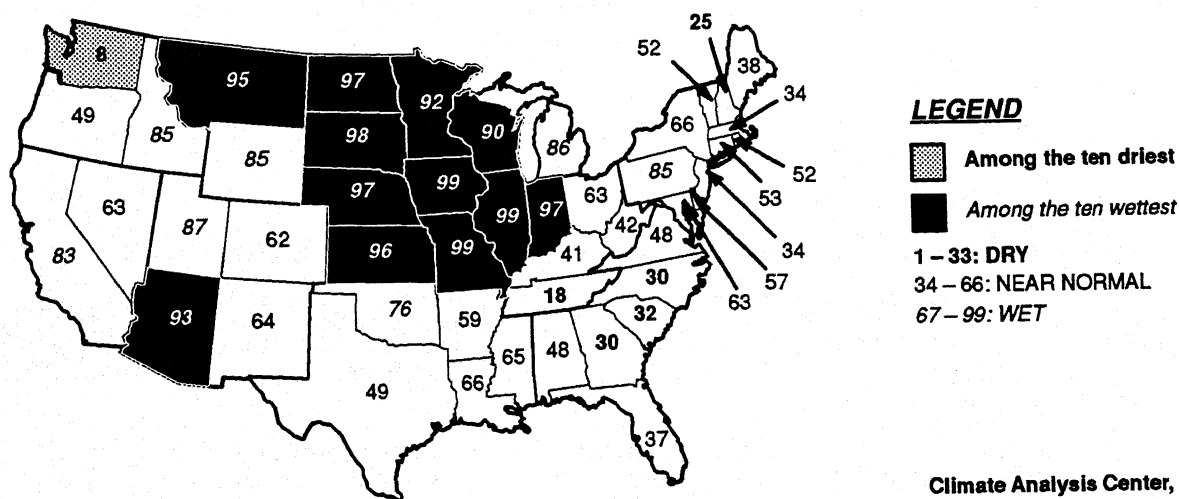
TABLE 2. RECORD NOVEMBER AVERAGE TEMPERATURES

STATION	DEPARTURE (°F)	AVERAGE (°F)	NORMAL (°F)	RECORD TYPE	RECORDS BEGAN
No Record November Average Temperatures Observed					

TABLE 3. RECORD NOVEMBER EXTREME TEMPERATURES

STATION	EXTREME (°F)	DATE OCCURRED	RECORD TYPE	RECORDS BEGAN
CHARLESTON, WV	85	November 14	HIGHEST	1948
WHEELING, WV	82	November 14	HIGHEST	1962
PHILADELPHIA, PA	81	November 15	HIGHEST	1941
NEW YORK/LAGUARDIA, NY	80	November 15	HIGHEST	1941
BOSTON, MA	78	November 15	HIGHEST	1936
NEWPORT, CT	78	November 15	HIGHEST	1948
PROVIDENCE, RI	78	November 15	HIGHEST	1954
WHEELING, WV	78	November 14	HIGHEST	1963
SAVANNAH, GA	60	November 1	HIGHEST	1944
HOUSTON, TX	31	November 28	LOWEST	1937
HOUSTON, TX	28	November 28	LOWEST	1939
SAN ANTONIO, TX	26	November 25	LOWEST	1940
SAN FRANCISCO, CA	13	November 26	LOWEST	1949
HOUSTON, TX	-7	November 24	LOWEST	1939
HOUSTON, TX	-8	November 24	LOWEST	1935
HOUSTON, TX	-14	November 26	LOWEST	1950
HOUSTON, TX	-16	November 24	LOWEST	1935

HISTORICAL PRECIPITATION RANKINGS BY STATE JANUARY - NOVEMBER 1993



Climate Analysis Center, NOAA

Based on preliminary data generated by the National Climatic Data Center

This chart depicts the ranking of the specific parameter, as measured during the period indicated, with respect to all other such periods on record since 1895.

EL NIÑO/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC ADVISORY 93/11

ISSUED BY

DIAGNOSTICS BRANCH
CLIMATE ANALYSIS CENTER/NMC

December 10, 1993

Lingering weak warm episode conditions, featuring warmer than normal SSTs and weaker than normal low-level easterlies, continued in the tropical Pacific during November. Positive sea surface temperature (SST) anomalies greater than 0.5°C dominated the tropics during November (Fig. 1). This pattern of SST anomalies is quite similar to that observed during November 1992, with the magnitude of the anomalies being slightly greater this year. Consistent with this pattern of tropical SST anomalies, weaker than normal low-level easterlies were found throughout the central and eastern tropical Pacific. However, in contrast to these indications of continuing warm episode conditions, convection in the central equatorial Pacific was near normal and the Southern Oscillation Index was near zero in November.

The depth of the oceanic thermocline, as measured by the depth of the 20°C isotherm, was less than normal in the western tropical Pacific and slightly greater than normal in the eastern tropical Pacific during November. Subsurface equatorial temperature anomalies, in the vicinity of the thermocline, were slightly positive east of 160°W and near -2°C in the

western Pacific. A Kelvin wave, initiated during August, reached the South American coast in late October, resulting in a brief increase in SST anomalies along the coast. A second, and apparently weaker Kelvin wave, developed in late October, and its effects (a deepening of the oceanic thermocline) reached the vicinity of 130°W by mid-November.

As in the past three years, positive sea level pressure (SLP) anomalies continued to be observed in the western tropical Pacific and over portions of Indonesia, as well as over the tropical Atlantic. However, only a small portion of the eastern tropical Pacific experienced negative SLP anomalies.

The overall pattern of SST anomalies, together with the persistent weak low-level easterlies, suggests the redevelopment of warm during the boreal winter.

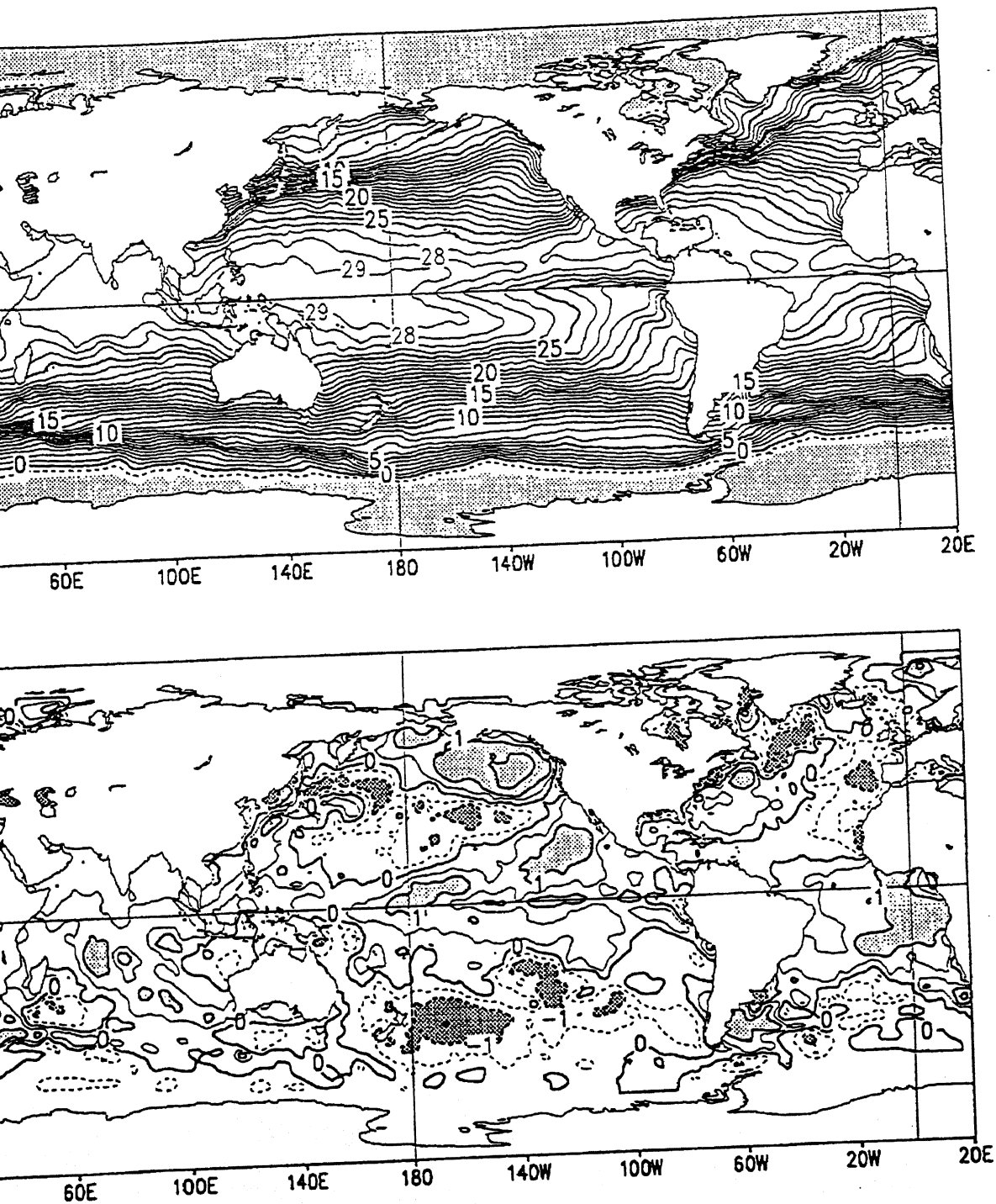


FIGURE 1. Sea surface temperature, a) mean (blended analysis) and b) anomalous, for November 1993. Mean SST contour interval is 2°C . Temperatures $> 20^{\circ}\text{C}$ are contoured every degree with odd contours dashed. Anomalies are computed as departures from the COADS/ICE climatology (Reynolds 1988, *J. Climate*, 1, 75–86). Anomaly contour interval is 1°C and negative contours are dashed.

